wherein an angular position of the element is adjustable, and wherein the element is centered and configured to be secured to prevent rotation.

5. (New) The drive bearing according to claim 4 further comprising:

an undercut on an inner bore of the coupling cone of the element; and

a tensioning rod having a spreading head, the rod configured to extend through the drive shaft of the servomotor so that the cone frictionally engages the counter recess in the drive shaft in that for a releasable holding of the coupling cone latter is provided with.

A1 (cont'd)

6. (New) The drive bearing according to claim 5, wherein the drive shaft further comprises channels for delivering a pressurized medium to detach the cone, released from the tightening rod, from the counter recess in the drive shaft.

Remarks

This Preliminary Amendment cancels without prejudice original claims 1 to 3 and substitute/annexed claims 1 to 3 in the underlying PCT Application No. PCT/CH00/00373, and adds without prejudice new claims 4 to 6. The new claims conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

In accordance with 37 C.F.R. § 1.121(b)(3), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(iii) and § 1.125(b)(2), a Marked Up Version Of The Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. Approval and entry of the Substitute Specification (including Abstract) are respectfully requested.

The underlying PCT Application No. PCT/CH00/00373 includes an International Search Report, dated October 13, 2000, and an International Preliminary Examination Report, dated October 16, 2001, copies of which are submitted herewith.

Applicant asserts that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully Submitted,

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[DRIVE BEARING ARRANGEMENT OF ROTATING TOOLS IN PRINTING MACHINES

Background of the Invention] Drive bearing arrangement of rotating tools in printing machines

The present invention relates to a drive bearing arrangement of rotating tools in printing machines, [particularly] specifically label printing machines[. Specifically, the arrangement of rotating tools at the drive shafts of such machines, for example], at the drive shaft, e.g., the drive shaft of a servomotor.

[It has been found to be advantageous] The present development in printing machines[---particularly], specifically label printing machines[---to allocate separate drives by means of a servo motor to the separate units of], goes to no longer to drive the rotating tools of the various printing units through a [printing machine such as the printing cylinder, embossing cylinder, or punching cylinder. This replaces the] central drive and gear wheels[(or chains or toothed belts).], chains or toothed belts, but to rather allocate to each separate tool such as e.g. printing cylinder, counter pressure cylinder, embossing and punching cylinder a own drive by means of a servo motor.

[Such a set-up is beneficial in that] This leads to a printing machine of which the individual components of each printing unit can be exchanged [relatively quickly and easily. This allows the machine to be used in a more optimal fashion.] very fast and in a simple way. Due to this a printing machine can be applied optimally.

[With regard to] Specifically at label printing machines,

[the] however, highest demands are made on the precise position of each tool[. Moreover,], which especially due to the simple and fast exchanging [potential] possibilities poses [high] highest demands on the interface of the change functions, namely the drive bearing arrangement between the one end of the tools and the drive shaft of the stationary mounted servomotor.

[Summary of the Invention
The object] Object of the present invention [is] has been to provide a drive bearing arrangement between a rotating tool and a drive shaft, which[,] in consideration of a [tool changes,] changing of tools can be disconnected [relatively quickly and improve] very fast and possibly improves the precision of the bearing in comparison with conventional solutions still more.

This object is solved [by providing a drive bearing for printing machines for coupling a rotating tool to a drive shaft of a servomotor. The drive bearing includes an element located at an interface between the tool and the drive shaft on a tool axis. The element has an axially projecting coupling cone that engages a counter recess of the drive shaft. The cone is releasably held in the recess by frictional engagement. The angular position of the element is adjustable, and the element is centered and configured to be secured to prevent rotation.] at a drive bearing arrangement if the kind defined above in accordance with the invention by the features of the characterising portion of claim 1. Specific embodiments of the subject of the invention are defined in the independent claims.

Due to the design of the drive bearing arrangement in accordance with the present invention[,] a geometrically

optimal coupling between the tool and the drive for the rotating printing tools are provided [that] which can be disconnected [quickly] fast and easily, which allows a fast exchanging of tools.

The invention will be explained below with reference to the embodiments illustrated in the drawing somewhat more in detail. There is illustrated in: [Brief Description of the Drawings]

[Fig. 1]Fig. 1 purely schematically [illustrates] a printing machine with a plurality of printing units and additional parts;

Fig. 2 [illustrates] a drive bearing [of the printing machine shown in Fig. 1] in accordance with the invention[; and], and

[Fig. 3 an embodiment of a coupling cone of the printing machine shown in Fig. 1.] Fig. 3 a variant of the coupling cone.

[Detailed Description of the Invention]In the figure Fig. 1 illustrates a modern printing machine of which the parts and printing units are driven electronically controlled through respective own servomotors. The printing machine includes a web reeling off unit 1, a conditioning unit 2, [which may include] e.g. a screen printing device 3, a printing device 4, a plurality of further printing units 5 - 9, a flex printing device 10 with a drying device 11, a supply part 12, a processing part 13 with punching device 14, reeling unit 15 and cutting unit 16, as well as a reeling unlit 7 as storage part[.], The individual units [are activated] get enlisted depending [on the task at hand] from the order

to be carried out.

The rotating tools can be [quickly] exchanged fast in order to be available for new [tasks] duties.

Fig. 2 illustrates how a rotating tool 18 is [releasablely but]releasable but absolutely firmly connected or coupled, respectively, via an element 19 mounted thereto having [an] a axial projecting connecting cone 20 to the drive shaft 21 of a servomotor 22 (illustrated schematically)[. The] (the other end of the tool 18 is held in a as such known manner in a bearing, e.g.[,] a needle bearing which is located in a easily detachable not illustrated flange of a frame[(not shown). Motor 22]). The motor is also mounted to a flange 23 of the base frame of the unit.

The servomotor 22 serves e.g. as drive for [one of a variety of cylinders or other devices in the printing machine. For example, servomotor 22 can drive] a form cylinder, a counter pressure cylinder[, a coloring apparatus, or any additional similar device.

The] or as drive for a colouring apparatus.

After a extending or pivoting away, respectively, of the (not illustrated) frame flanges the tools (form cylinder, counter pressure cylinder, [coloring apparatus) first extend or pivot away from the frame flanges (not illustrated). Each tool is provided with connecting] colouring apparatus) each of which being provided with coupling cone [20 and] is inserted into the cone shaped recesses 24 of the drive shafts 21 and precisely [centered] centred therein. In order to have the tool sitting with the correct angular position on the drive

shaft 21[,] a pin 25 is [employed to anchor] foreseen which holds the coupling cone 20[. The pin 25 also safeguards against unwanted rotation with respect to recess 24. The coupling occurs by] in the correct position (ads possibly also to safeguard against rotating). The coupling proper proceeds by a frictional engagement between the surfaces of the cone 20 and the cone shaped recess 24 in that the coupling cone 20 is tightened by means of a tightening rod 26 (26') against the drive shaft 21 [(for example,] (by a tightening at the right hand side end, e.g., through a threaded drive).

[Tightening] The tightening rod [26 (26')] (see Fig. 2) engages thereto a central undercut bore 27 of the cone 20 where a spreading head is located which can be extended to such an extent that the cone 20 is tightened and a optimal drive connection is provided. In order to release the drive connection or the drive bearing[,] it is [only] merely necessary to release the tightening rod 26 (with spreading head 28).

[In order to quickly release] For a simple, fast releasing of the cone coupling[,] it is possible to use a pressurized medium [such as air is passed through] (e.g., pressurized air) via channels 29.

Fig. 3 of the drawing illustrates a variant of e element 19' with coupling cone 20' and undercut, central bore 27'.

This element 19' is suitable for an axial screwing onto a tool by means of several screws (Screw holes 30).

[

Abstract

A drive bearing for printing machines for coupling a rotating tool to a drive shaft of a servomotor. The drive bearing including an element located at an interface between the tool and the drive shaft on a tool axis. The element has an axially projecting coupling cone that engages a counter recess of the drive shaft. The cone is releasably held in the recess by frictional engagement. The angular position of the element is adjustable, and the element is centered and configured to be secured to prevent rotation.]